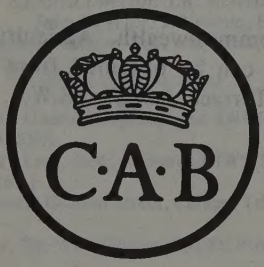
FIELD CROP ABSTRACTS

Volume 32



Prepared by

Commonwealth Bureau of Pastures and Field Crops, Hurley

1979

ISSN 0015-069X

© *Commonwealth Agricultural Bureaux 1980*

All rights reserved. No part of this publication may be reproduced in any form or by any means, electronically, mechanically, by photocopying, recording or otherwise, without the prior permission of the copyright owner.

The Executive Council of the Commonwealth Agricultural Bureaux is a signatory to the Fair Copying Declaration, details of which can be obtained from The Royal Society, 6 Carlton House Terrace, London, S.W.1.

published by

Commonwealth Agricultural Bureaux,
Farnham House, Farnham Royal,
SLOUGH SL2 3BN, UK.

printed by

Unwin Brothers Ltd., The Gresham Press, Old Woking, Surrey, UK.

COMMONWEALTH AGRICULTURAL BUREAUX

The Commonwealth Agricultural Bureaux (CAB) is a co-operative venture established by Commonwealth Governments to provide information and other specialised services for scientists and professional workers in agriculture and related fields. The organisation is controlled by an Executive Council composed of nominees of the various Commonwealth Governments, including one for the Dependent Territories. The following pages list the present members of the Executive Council, and Liaison Officers who form the primary link in the member country.

CAB has three main functions: a world agricultural information service, an identification service for entomology, mycology and helminthology, and a biocontrol service. CAB's information service is based on 46 abstract journals which, taken together, cover the whole range of agricultural science. Contemporary world literature in many languages is scanned for items worthy of noting by abstract or titles in the journals. Since 1973 all references have been made available in machine-readable form for batch searching and online retrieval. The database contains approximately 950,000 records and is increasing by 12,000 per month. Other publications include technical periodicals, annotated bibliographies, review articles and books. An information retrieval service ensures that individual needs are met, and also supplies photocopies of source papers.

The work of CAB is largely carried out through a number of Institutes and Bureaux, each dealing with a particular aspect of agricultural science. Enquiries on scientific aspects of CAB work should be sent to the Director of the appropriate Bureau. Other enquiries should be sent to the Executive Director, CAB, at the address below, or to Liaison Officers in member countries.

Headquarters

Farnham House, Farnham Royal, Slough SL2 3BN, UK
Tel: Farnham Common 2281
Telex: 847964
Cables: COMAG, SLOUGH

Executive Director: N.G. Jones, DFC, BSc
Editorial Director: J.R. Metcalfe, MA, PhD
Sales Director: J. Newton, BSc, PhD
Scientific Adviser: E.K. Woodford, OBE, MSc, PhD

Institutes

Commonwealth Institute of Entomology, 56 Queen's Gate, London SW7 5JR. Tel: 01-584-0067/8
Director: N.C. Pant, MScAgr, DIC, PhD, FNA.
Commonwealth Mycological Institute, Ferry Lane, Kew, Richmond TW9 3AF. Tel: 01-940-4086/7
Director: A. Johnston, BSc, AICTA, FIBiol.
Commonwealth Institute of Biological Control, Gordon Street, Curepe, Trinidad, West Indies. Tel: St. Augustine (662) 4173
Director: F.D. Bennett, BSA, PhD.
Commonwealth Institute of Helminthology, The White House, 103 St. Peter's Street, St. Albans, AL1 3EW, Herts. Tel: St. Albans (0727) 33151
Director: Miss S.M. Willmott, PhD, FIBiol.

Bureaux

Agricultural Economics, Dartington House, Little Clarendon Street, Oxford OX1 2HH. Tel: Oxford (0864) 59829.
Director: J.O. Jones, MA.
Animal Breeding and Genetics, Animal Breeding Research Organization, The King's Buildings, West Mains Road, Edinburgh EH9 3JX. Tel: Edinburgh (031) 667-6901
Director: J.D. Turton, BSc, MRCVS, DTVM.
Animal Health, Central Veterinary Laboratory, New Haw, Weybridge, KT15 3NB, Surrey. Tel: Byfleet (09323) 42826
Director: R.M. Mack, FRCVS.
Dairy Science & Technology, Lane End House, Shinfield, Reading RG2 9BB. Tel: Reading (0734) 883895
Director: E.J. Mann, NDD, CDD.
Forestry, Commonwealth Forestry Institute, South Parks Road, Oxford OX1 3RD. Tel: Oxford (0865) 57185
Director: W. Finlayson, BSc.
Horticulture & Plantation Crops, East Malling Research Station, Maidstone ME19 6BJ, Kent. Tel: West Malling (0732) 843833
Director: D.J. O'D. Bourke, MA, DipAgr, FLS.
Nutrition, Rowett Research Institute, Bucksburn, Aberdeen AB2 9SB. Tel: Bucksburn (0224) 712162
Director: A.A. Woodham, BSc, PhD, CChem, FRIC.
Pastures & Field Crops, Grassland Research Institute, Hurley, Maidenhead SL6 5LR. Tel: Littlewick Green (062 882) 3457
Director: P.J. Boyle, MA.
Plant Breeding & Genetics, Department of Applied Biology, Pembroke Street, Cambridge CB2 3DX. Tel: Cambridge (0223) 358381 (Ext. 216)
Director: R.H. Richens, MA, PhD.
Soils, Rothamsted Experimental Station, Harpenden AL5 2JQ, Herts. Tel: Harpenden (05827) 63133 (Ext. 271)
Director: B. Butters, MSc, DipAgr, DTA, DIC, ARCS.

EXECUTIVE COUNCIL

(as at 1 September 1979)

Member	*Representing*
G.M.P. MYERS (Chairman)	United Kingdom
R.B. RYANGA(Vice-Chairman)	Kenya
J. KOOP	Canada
Dr. R.M. MOORE	Australia
R.W. FOSTER	New Zealand
Dr. M. DHAR	India
J.C. RAJEPAKSE	Sri Lanka
Y.N. OHENE-AKRASI	Ghana
THE SECOND SECRETARY	Malaysia
THE FIRST SECRETARY	Nigeria
A. ANTONIADES	Cyprus
H.E. THE HIGH COMMISSIONER	Sierra Leone
Mrs. L.E. HOWELL	Tanzania
D. LINSAY	Jamaica
N. HAZEL	Trinidad & Tobago
H.E. THE HIGH COMMISSIONER	Malawi
THE TRADE COMMISSIONER	Zambia
O.A. SECKA	The Gambia
N. BURGESS	Guyana
H.E. THE HIGH COMMISSIONER	Botswana
T. NARRAINEN	Mauritius
P.K. MISHRA	Fiji
R.A. KHAN	Bangladesh
H.E. THE HIGH COMMISSIONER	The Bahamas
F.B.C. REIHER	Papua New Guinea
J.E. WHITELEGG	Dependent Territories

C. deLAET, Secretary, Commonwealth Science Council (Observer)

N.G. JONES, DFC, BSc (Executive Director)

LIAISON OFFICERS

(as at 1 September 1979)

Contributing country	*Liaison Officer*	*Address*
United Kingdom	Under Secretary	Agricultural Research Council, 160, Great Portland Street, London W1N 6DT.
Canada	G.M. Carman, BSA, MSc, PhD.	Director, Information Division, Administration Branch, Canada Department of Agriculture, 1105 Sir John Carling Building, Ottawa, Ontario, K1A OC7.
Australia	P.F. Butler, MAgrSc.	Senior Assistant Secretary (Research) Commonwealth Scientific & Industrial Research Organization, PO Box 225, Dickson, ACT 2602.
New Zealand	G.W. Butler, MSc, Fildr, FRSNZ.	Assistant Director-General, Department of Scientific and Industrial Research, Private Bag, Wellington.

India	O.P. Gautam, PhD	Director-General, Indian Council of Agricultural Research, Krishi Bhavan, New Delhi 1.
Sri Lanka	G.W.E. Fernando, BSc, MSc, PhD.	Senior Deputy Director of Agriculture (Research), Central Agricultural Research Institute, Gannoruwa, Peradeniya.
Ghana	Executive Chairman	Council for Scientific & Industrial Research, PO Box M.32, Accra.
Malaysia	Permanent Secretary	Ministry of Agriculture & Co-operatives, Swettenham Road, Kuala Lumpur.
Nigeria	The Director	Agricultural Science Research Department, Moor Plantation, P.M.B. 5382, Ibadan.
Cyprus	A. Papasotomontos, PhD.	Director General, Ministry of Agriculture & Natural Resources, Nicosia.
Sierra Leone	Senior Lecturer	Njala University College, PMB Freetown.
Tanzania	Director of Agriculture	Ministry of Agriculture, PO Box 9071, Dar-es-Salaam.
Jamaica	I.E. Johnson, PhD, MSc, DICTA, FEDI.	Chief Technical Officer, Ministry of Agriculture, PO Box 480, Kingston 6.
Trinidad & Tobago	Chief Technical Officer (Crop Research)	Ministry of Agriculture, Central Experiment Station, Centeno, Via Arima Post Office, Trinidad.
Kenya	Director of Agriculture	Ministry of Agriculture, PO Box 30028, Nairobi.
Malawi	Chief Agricultural Research Officer	Ministry of Agriculture & Natural Resources, PO Box 30134, Capital City, Lilongwe 3.
Zambia	Permanent Secretary	Ministry of Rural Development, PO Box RW.197, Lusaka.
The Gambia	Permanent Secretary	Ministry of Agriculture & Natural Resources, The Quadrangle, Banjul.
Guyana	Deputy Chief Agricultural Office (Research)	Ministry of Agriculture PO Box 1001, Georgetown.
Botswana	Permanent Secretary	Ministry of Agriculture, Common Service Division, Private Bag 0028, Gaborone.
Mauritius	B.D. Roy	Chief Agricultural Officer, Agricultural Services, Reduit.
Fiji	Permanent Secretary	Agriculture, Fisheries & Forests, Rodwell Road, Suva.
Bangladesh	Dr. K. Badruddoza MAgr, PhD, DipGenPB.	Director, Bangladesh Agricultural Research Institute, 87 Pioneer Road, Kakrail, Dacca-2.
The Bahamas	Director of Agriculture	Ministry of Agriculture & Fisheries, PO Box 3028, Nassau. N.P.
Papua New Guinea	The Secretary	The Department of Primary Industries P.O. Box 2417, Konedomu.

COMMONWEALTH BUREAU OF PASTURES AND FIELD CROPS
HURLEY, MAIDENHEAD, BERKS SL6 5LR, UK

The Commonwealth Bureau of Pastures and Field Crops is located at the Grassland Research Institute, Hurley, and is one of a group of 10 Bureaux and 4 Institutes which together form the Commonwealth Agricultural Bureaux, an organization financed and administered jointly by the various Commonwealth Governments and Dependent Territories. The Commonwealth Agricultural Bureaux produce 26 abstract journals covering the major branches of agricultural and related sciences. The journals and their subscription rates are listed on the back cover.

The Bureau prepares two monthly journals, *Herbage Abstracts* and *Field Crop Abstracts,* for publication by the Commonwealth Agricultural Bureaux, Farnham Royal, Bucks. These journals contain abstracts of the research findings reported in the world scientific literature on annual field crops, pastures, herbage plants and rangelands and provide both a comprehensive guide to current scientific and technological developments in their subjects and a key to the literature published in the past. In addition to abstracts, the Bureau also issues reviews and monographs on selected subjects.

Scope of Field Crop Abstracts: The subjects covered include the agronomy and major aspects of the biology of all annual field crops grown for food, fodder, oil and fibre, and of tobacco. Land use, farming systems, agricultural meteorology and the control of weeds, pests and diseases are dealt with only in so far as they concern the crop coverage.

The Bureau is prepared, on request, to undertake literature searches and to compile bibliographies on subjects within its scope. A list of bibliographies already compiled is published in this journal.

Director
P.J. Boyle, MA (Agric) (Cantab)

Assistant Director
A.C. Trueblood, BA (Cantab), AICTA (Trinidad)

Scientific Information Officers
J. Armstrong, MA (Agric), DipAgric (Cantab), DTA (Trinidad)
R. Boyce, BSc (Dunelm), MIInfSc.
Miss J.E. Brown, BSc (London)
Mrs. A.M. Hall, PhD (Cantab)
R.J. Lewington, PhD (Southampton)
M.S. Mahal, BSc (Agric) (Punjab), PhD (Moscow)
N.J. Pryor, BSc (Agric) (Wales) MIInfSc
Mrs. N.R. Sym, BSc (Ceylon), MPhil (Reading)
Mrs. E.M. Vincent, BSc, MSc (Newcastle-upon-Tyne) PhD (Reading)

Consultant Director
A. Lazenby, MSc (Wales), MA, PhD (Cantab), FTS

Other Abstractors
A.V. Bogdan, CandBiolSci (Rostov); T.I. Emecz, BSc; C.H. Fawcett, PhD; J.D.B. Griffin, AIL; M.R. Hails, BSc; P.C. Hodgson, MA; Miss K.H. Lowry, MSc; Mrs. L.K. Mayers, BSc; Mrs. J.R. Morgan, BSc; Mrs. E. Biasutti Owen (Dr. Milan); Mrs. I.M. Penning, PhD; Miss F.A. Stitson, BSc; C.C. Tanner, PhD; Mrs. J.M. Taylor, BSc; M. Tollemache; Mrs. S.M. Yaxley, BSc.

NOTES TO READERS

The address given at the end of abstract citations is that of the first author at the time of writing and is normally where the work was carried out.

Transliteration of Cyrillic script is based on the International Standard ISO/R9 1968 (E).

The titles of periodicals and reports conform where possible to those given in the *World List of Scientific Periodicals* (4th Edn; London: Butterworth) and are listed in *Field Crop Abstracts* Vol. 30, No. 1, on pp. 1-11, they can also be obtained as a separate from the Bureau of Pastures and Field Crops, Hurley, Maidenhead SL6 5LR, price £1.00.

LANGUAGE SYMBOLS

The language symbols used are listed below. An initial capital letter denotes the main language of a paper, a small letter the language of the summary(ies).

Af	Afrikaans	Fi	Finnish	Nl	Dutch, Flemish
Al	Albanian	Fr	French	No	Norwegian
Ar	Arabic	Gr	Greek	Pe	Persian
Be	Belorussian	He	Hebrew	Pl	Polish
Bg	Bulgarian	Hu	Hungarian	Pt	Portuguese
Ch	Chinese	Ia	Interlingua	Ro	Romanian
Cr	Croat	In	Indonesian	Ru	Russian
Cs	Czech	Is	Icelandic	Sh	Serbo-Croat
Da	Danish	It	Italian	Sk	Slovak
De	German	Ja	Japanese	Sn	Slovene
Ee	Estonian	Ko	Korean	Sr	Serbian
En	English	La	Latin	Sv	Swedish
Eo	Esperanto	Li	Lithuanian	Tr	Turkish
Es	Spanish	Lv	Latvian	Uk	Ukrainian
		Ma	Macedonian		

ABBREVIATIONS

The abbreviations used for the names of common units, mathematical operations, chemical elements, etc., are in accordance with British Standard 1991 : 1967. Additional abbreviations used follow the CAB Standard List of Abbreviations, which is published in the Annual Index; a copy may be obtained from the Bureau, price £0.15. In addition, the following are used:

FCA	*Field Crop Abstracts*	*HbA*	*Herbage Abstracts*

CAB STANDARD LIST OF ABBREVIATIONS

AAS	atomic absorption spectrometry
ABA	abscisic acid
a.c.	alternating current
ACTH	adrenocorticotropic hormone
ad lib.	ad libitum
ADP	adenosine diphosphate
a.e.	acid equivalent
a.i.	active ingredient
AI	artificial insemination
alt.	altitude
a.m.	*ante meridiem*
approx.	approximately
aq.	aqueous
ATP	adenosine triphosphate
Aug.	August
av.	average
BOD	biochemical oxygen demand
b.p.	boiling point
c.	circa
CA	controlled atmosphere
cAMP	cyclic adenosine monophosphate
CEC	cation exchange capacity
cf.	compare
CF	crude fibre
CGR	crop growth rate
CNS	central nervous system
COD	chemical oxygen demand
coeff.	coefficient
col.	coloured
conc.	concentrated
const.	constant
CP	crude protein
CR	conception rate
cryst.	crystalline
CSIRO	Commonwealth Scientific and Industrial Research Organization [Australia]
cv.	cultivar
CV	coefficient of variation
d.b.h.	diameter at breast height
d.c.	direct current
DCP	digestible crude protein
DDM	digestible dry matter
DE	digestible energy
Dec.	December
DHIA	Dairyherd Improvement Association
DM	dry matter
diam.	diameter
dil.	dilute
DMSO	dimethyl sulphoxide
DNA	deoxyribonucleic acid
DOCA	desoxycorticosterone acetate
DOM	digestible organic matter
DTA	differential thermal analysis
E.	east
ED	effective dose
EDTA	ethylenediaminetetracetic acid
EEC	European Economic Community
e.g.	for example
Eh	oxidation-reduced potential
ESP	exchangeable sodium percentage
et al.	et alii
f.	*forma*
F	filial generation
F	inbreeding coefficient
FAD	flavin adenine denucleotide
FAO	Food and Agriculture Organization
FCM	fat-corrected milk
FDA	Food and Drug Administration
Feb.	February
FGA	fluorogestone acetate
FMN	flavin mononucleotide
f.p.	freezing point
FSH	follicle stimulating hormone
FSHRH	FSH-releasing hormone
f.sp.	*forma specialis*
FU	food unit/fodder unit
FYM	farmyard manure
g.b.h.	girth at breast height
gen.	genus
GLC	gas-liquid chromatography
GnRH	gonadatropin-releasing hormone
Gram+	Gram positive
Gram−	Gram negative
h^2	heritability
Hb	haemoglobin
HCG	human chorionic gonadatropin
ht.	height
ICSH	interstitial cell stimulating hormone
i.e.	that is
IR	infrared
IU	international unit
IVT	Illini variable temperature
Jan.	January
LAI	leaf-area index
LAR	leaf-area ratio
lat.	latitude
LC	lethal concentration
LD	lethal dose
LH	luteinizing hormone
LHRF	LH-releasing factor
LHRH	LH-releasing hormone
loc.cit.	place cited
long.	longitude
M[small cap]	molar
MA	megestrol acetate
m.a.i.	mean annual increment
MAP	6-α-methyl-17α-acetoxy-progesterone
max.	maximum
m.c.	moisture content
ME	metabolizable energy
MGA	melengestrol acetate
min.	minimum
mol.	molecular
m.p.	melting point
MS	mass spectrometry
MU	mouse unit
N.	north
N[small cap]	normal [concentration]
NAD+	nicotinamide adenine dinucleotide (oxidized form)
NADH	nicotinamide adenine dinucleotide (reduced form)
NADP+	nicotinamide adenine dinucleotide phosphate (oxidized form)
NADPH	nicotinamide adenine dinucleotide phosphate (reduced form)
NAR	net assimilation rate
NE	north-east
NFE	nitrogen-free extract
NMR	nuclear magnetic resonance
Nov.	November
NW	north-west
obs.	observed
Oct.	October
OM	organic matter
opt.	optimum
P	parental generation
P	probability
p.a.	*per annum*
PG	prostaglandin
pH	hydrogen-ion concentration
p.m.	*post meridiem*
PMB	pregnant mare blood
PMS	pregnant mare serum
PMSG	pregnant mare serum gonadotropin
PMU	pregnant mare urine
post-em.	post-emergence
p.p.h.m.	parts per hundred million
p.p.m.	parts per million
ppt.	precipitate
pre-em.	pre-emergence
PVC	polyvinyl chloride
q.v.	which see
RBV	relative breeding value
resp.	respectively
RGR	relative growth rate
RH	relative humidity
RNA	ribonucleic acid
RU	rat unit
S.	south
SAR	sodium absorption ratio
s.d.	standard deviation
SE	south-east
s.e.	standard error
Sept.	September
SNF	solids not fat
sol.	solution
sp.	species
sp.gr.	specific gravity
SSP	soluble sodium percentage
s.t.p.	standard temperature and pressure
str.	strain
SW	south-west
syn.	synonym
TDN	total digestible nutrients
temp.	temperature
TG	thermogravimetry
TLC	thin-layer chromatography
TMV	tobacco mosaic virus
UHT	ultra-high temperature
USDA	United States Department of Agriculture
UV	ultraviolet
var.	variety
VFA	volatile fatty acids
viz.	namely
vol.	volume
v.p.m.	volume per million
vs.	versus
v/v	volume/volume
W.	west
WHO	World Health Organization
wk	week
w.p.	wettable powder
wt.	weight
w/v	weight/volume
w/w	weight/weight
yr	year

April 1977

FIELD CROP ABSTRACTS VOLUME 32, 1979

CONTENTS

REVIEW ARTICLES

Intercropping - Its Importance and Research Needs. Part 1. Competition and Yield Advantages, by R.W. Willey ... 1

Intercropping - Its Importance and Research Needs. Part 2. Agronomy and Research Approaches, by R.W. Willey ... 73

ABSTRACTS

CEREALS

Wheat	11	87	165	237	307	389	469	549	631	701	773	873
Oats	16	96	175	245	315	399	477	558	638	709	782	880
Rye	17	96	176	246	316	401	478	560	639	709	784	880
Triticale	17	97	176	–	316	401	479	561	640	710	786	881
Barley	17	97	176	247	317	402	479	561	640	710	786	881
Wild-rice	–	100	–	249	323	405	482	–	643	–	–	–
Maize	19	101	180	249	323	405	482	564	643	715	791	885
Sweet corn	–	108	185	–	330	413	–	569	647	–	800	–
Rice	27	109	185	254	331	413	490	569	647	720	800	892
Sorghum	32	113	191	258	335	416	494	573	651	724	805	895
Pennisetum typhoides	34	114	–	260	336	418	495	–	652	725	806	896
Panicum miliaceum	–	114	192	260	336	418	496	574	652	–	–	897
Panicum miliare	–	–	–	–	–	–	–	–	–	–	–	–
Eleusine coracana	34	114	192	–	336	419	496	–	653	725	807	897
Minor cereals	–	–	–	–	–	–	–	–	–	725	–	897
Cereals, general	35	115	192	260	337	419	496	574	653	725	807	897

LEGUMES

Soyabeans	35	115	194	261	338	420	497	576	655	727	810	898
Groundnuts	39	120	198	264	342	425	501	580	657	729	815	903
Peas	40	120	199	265	344	426	502	584	658	730	816	904
Vicia spp.	42	123	202	267	346	429	505	586	660	733	819	906
Phaseolus spp.	43	123	202	268	347	431	506	588	661	733	821	907
Vigna spp.	44	126	205	271	350	433	509	591	663	736	824	911
Trifolium spp.	–	–	–	–	–	–	–	–	–	–	–	–
Voandzeia subterranea	–	–	–	–	–	–	–	–	–	–	–	–
Cajanus cajan	46	127	205	271	350	433	509	–	–	737	825	912
Cicer arietinum	46	127	–	271	351	434	509	591	664	737	826	912
Lens esculenta	46	128	–	271	351	–	–	–	664	737	827	–
Lupinus spp.	46	128	205	271	351	434	509	591	664	738	827	912
Minor legumes	–	–	–	–	351	–	510	592	–	739	827	–
Legumes, general	47	129	206	272	352	435	510	592	665	739	828	912

ROOT CROPS

Sugar beet	47	130	206	272	352	435	510	593	666	739	829	913
Fodder beet	–	132	209	–	355	437	513	–	–	741	832	915
Turnips and Swedes	49	132	209	274	355	–	513	–	667	–	832	–
Potatoes	49	133	209	274	355	438	513	595	668	741	832	915
Carrots	–	139	–	–	–	442	–	–	–	–	–	–
Sweet potatoes	52	139	213	279	361	442	518	602	671	748	837	920
Cassava	52	139	–	–	361	442	518	–	672	748	838	920
Yams	53	140	213	–	362	442	–	603	672	748	839	921
Cocoyams	–	–	–	–	–	–	–	–	–	–	839	921
Minor root crops	–	–	–	–	–	443	–	603	–	–	839	–
Root crops, general	53	–	213	–	362	–	519	603	–	748	839	–

FIBRE CROPS													
Cotton	53	140	214	279	362	443	519	604	672	749	839	921	
Fibre Flax	–	143	217	282	364	446	521	606	674	751	842	923	
Hemp	–	144	217	282	365	–	522	606	674	751	842	923	
Jute	56	–	–	282	–	446	522	606	675	751	842	923	
Minor fibre crops	–	–	–	–	–	446	522	606	675	751	842	–	
Fibre crops, general	–	–	–	–	–	–	–	–	–	–	–	–	
OILSEED CROPS													
Castor	56	144	217	282	365	446	–	607	675	751	843	924	
Sesame	–	–	217	–	365	447	522	–	–	752	843	–	
Oilseed flax	56	144	217	–	366	447	522	607	675	752	843	924	
Safflower	56	144	218	–	366	447	522	–	676	752	843	925	
Sunflower	57	144	218	282	366	448	523	608	676	752	843	925	
Rape	58	146	219	283	367	449	525	609	678	753	845	927	
Minor oilseed crops	–	146	–	–	368	450	526	610	678	754	845	927	
Oilseed crops, general	–	147	220	284	368	451	526	611	679	754	–	–	
MISCELLANEOUS CROPS													
Tobacco	59	147	221	284	369	451	526	611	679	754	847	927	
Brassica oleracea	60	–	222	285	–	–	528	–	–	756	850	–	
Fodder radish	–	–	–	–	–	–	–	–	–	–	–	–	
Buckwheat	–	150	222	285	370	454	529	–	680	757	850	930	
Other crops	–	–	–	–	–	–	–	–	–	–	850	–	
Miscellaneous crops, general	–	–	–	–	–	–	–	–	–	757	850	–	
GREEN MANURES	–	–	223	–	370	454	529	613	–	–	–	–	
CROP BOTANY													
Physiology	60	150	223	286	371	455	529	613	681	758	851	931	
Chemical composition	–	152	226	287	373	456	530	615	683	759	854	932	
Morphology and anatomy	62	152	227	–	–	456	531	–	–	–	–	933	
Environmental factors	62	152	227	287	373	456	531	615	683	759	854	933	
Nodulation	63	154	228	288	375	458	532	–	683	760	855	934	
Radiobiology	63	–	–	288	–	–	533	–	684	–	–	–	
Taxonomy	–	–	229	–	–	–	–	–	–	–	–	934	
Techniques and apparatus	63	154	229	288	375	458	533	616	684	760	855	934	
Miscellaneous	–	155	230	289	377	459	–	618	–	760	857	935	
WEEDS	–	155	230	289	377	–	–	618	–	761	857	–	
SURVEYS AND LAND USE	63	–	230	–	377	–	534	618	685	761	857	935	
FARMING SYSTEMS	64	155	231	289	378	459	534	619	685	761	857	936	
SOIL AND WATER CONSERVATION	65	–	233	291	381	460	535	621	687	762	860	937	
AGROMETEOROLOGY	66	157	233	291	381	460	536	621	–	762	860	937	
MISCELLANEOUS	–	–	–	–	–	462	537	–	–	–	861	939	
REPORTS	66	158	234	291	382	462	537	622	687	763	861	939	
MEETINGS	69	162	235	300	385	462	540	625	693	769	865	948	
BOOKS	71	162	235	301	385	467	548	630	698	771	870	950	
AUTHOR INDEX													953
SUBJECT INDEX													995

ERRATA

(lines are counted from the beginning of the bibliographic data in each item.)

Volume 32

Page	*Abstract*	*Line*	
33	192	18	Insert 'and panicle' before 'length'
129	1006	4	Insert '*Instytut*' after '*-issledovalel'skii*'
214	1832	4	For '*Nauchnykh*' read '*Nauchnykh Trudov,*'
280	2464	9	Insert '1.78 or 3.55 kg' after 'of'
319	2865	14	For 'B' read 'benodanyl'
379	3446	10	After '200' insert 'kg N, 200 kg'
414	3787	6	Insert '*d'Agriculture*' after '*l'Academie*'
432	3941	19	For 'phytoaemagglutinin' read 'phytohaemagglutinin'
443	4041	3	For '*VASHhNIL*' read '*VASKhNIL*'
446	4071	7	For 'Costal' read 'coastal'
451	4117	8	For 'Papveraceae' read 'Papaveraceae'
471	4329	30	For 'DN' read 'DM'
495	4555	3	For '*Research*' read '*Science*'
507	4670	2	For '**brown**' read '**grown**'
554	5170	3-5	Write from 'Vsesnoyuznogo. . . . .' to '. . . . . Vavilova' in italics
562	5237	3-5	Write from 'Vsesoyuznogo. . . . .' to '. . . . . Vavilova' in Italics
717	6795	10	Insert 'was studied' after 'acid'
752	7129	24	Insert '[1 feddan = 0.42 ha]' after 'treatments'
765	7291	4	Write 'Lens culinaris' in Italics
771	7388	1	Insert '(EDITOR)' after 'GARIFULLIN, F.SH.'
784	7517	7	Insert 'In oat grain.'. For 'Grown' read 'grown'
784	7517	10,11	Delete 'In oat grain'
840	8069	7	Insert 'depleted to' after 'was'